

May 29, 1934.

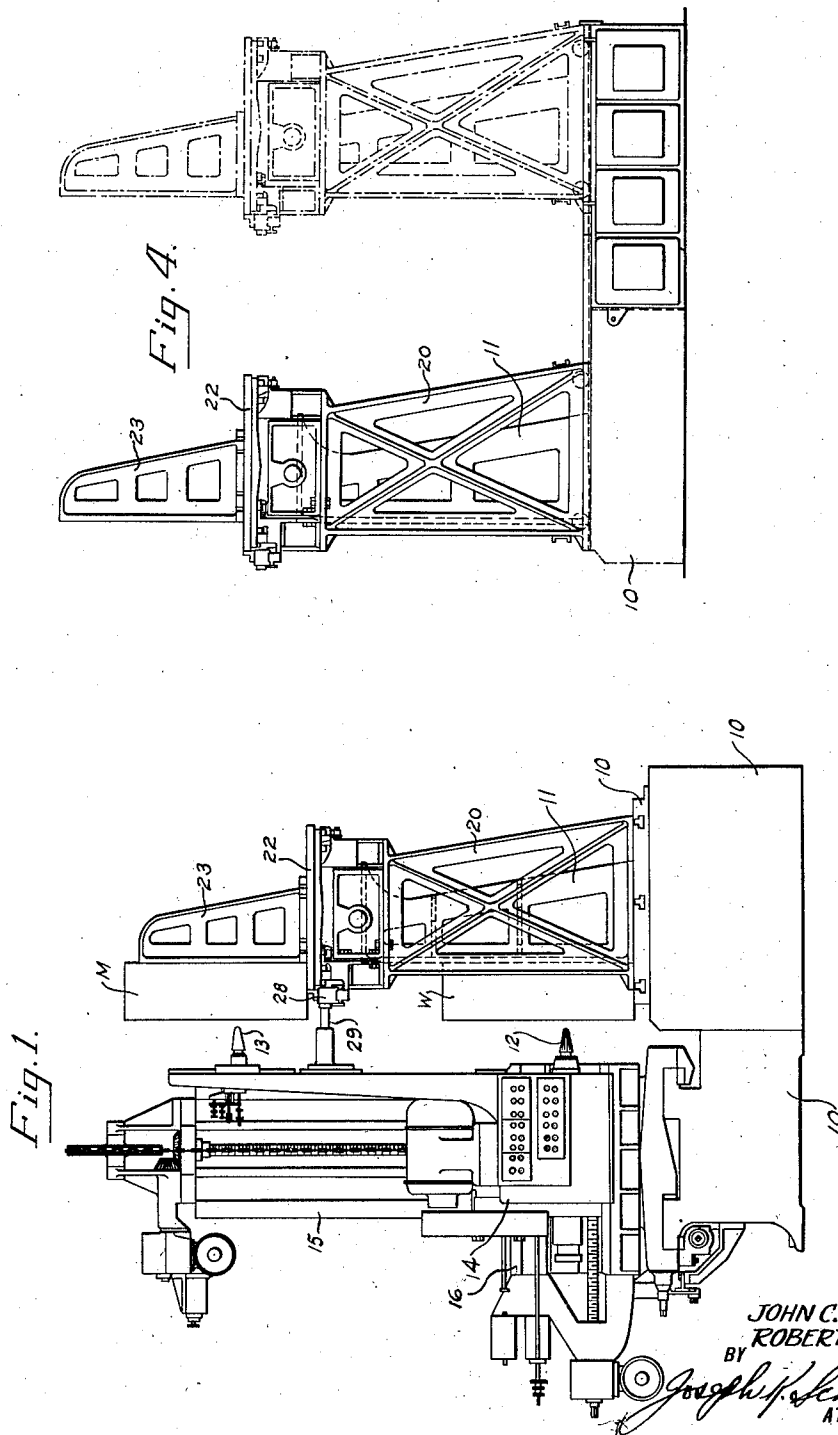
J. C. SHAW ET AL

1,960,757

RIGHT AND LEFT ATTACHMENT FOR DUPLICATING MACHINES

Filed Nov. 7, 1932

2 Sheets-Sheet 1



INVENTORS
JOHN C. SHAW.
ROBERT D. SHAW.
BY *Joseph P. Schaefer*
ATTORNEY

May 29, 1934.

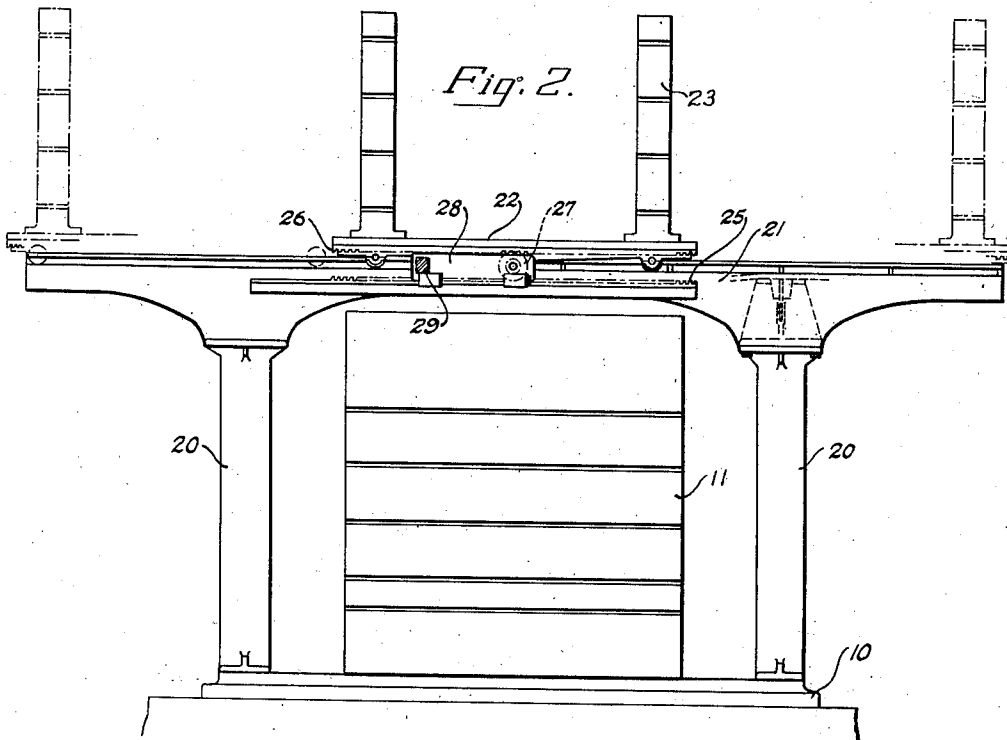
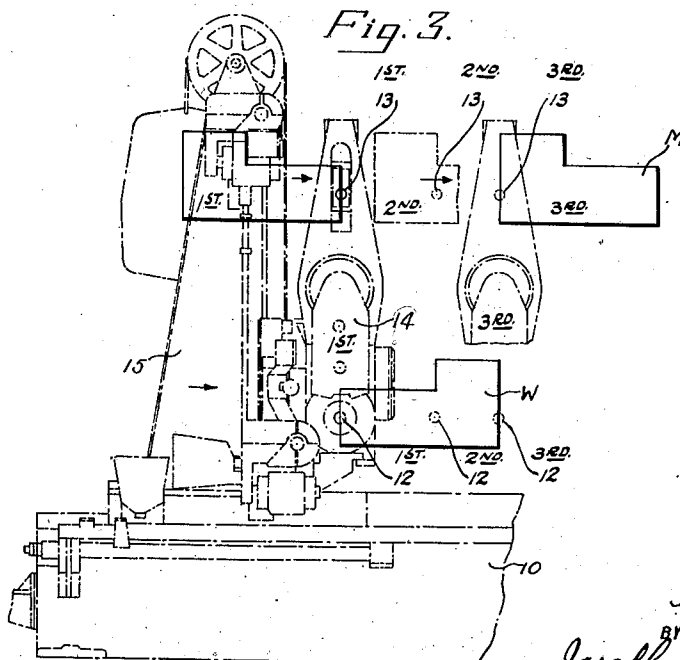
J. C. SHAW ET AL

1,960,757

RIGHT AND LEFT ATTACHMENT FOR DUPLICATING MACHINES

Filed Nov. 7, 1932

2 Sheets-Sheet 2



INVENTORS
JOHN C. SHAW.
ROBERT D. SHAW.
BY *Joseph P. Schofield*
ATTORNEY

UNITED STATES PATENT OFFICE

1,960,757

RIGHT AND LEFT ATTACHMENT FOR
DUPLICATING MACHINESJohn C. Shaw and Robert D. Shaw, Hartford,
Conn., assignors to Pratt & Whitney Company,
Hartford, Conn., a corporation of New Jersey

Application November 7, 1932, Serial No. 641,511

6 Claims. (Cl. 90—13)

This invention relates to duplicating machines and particularly to an automatic die sinking machine adapted to reproduce irregular contours and outlines of various shapes.

5 An object of the present invention is to enable a right or left counterpart of an article to be reproduced from a model of either the left- or right-hand form thus enabling a model of a right-hand article to be used for reproducing the
10 corresponding left-hand object.

A further object of the invention is to provide a model supporting means disposed movably relative to the material being operated on, this model support being movable laterally predetermined
15 distances relative to the fixed work piece during the operation of the machine.

Another object of the invention is to provide an attachment or addition to a die sinking or duplicating machine such as shown in the patent
20 to Shaw No. 1,683,581, this attachment taking the form of a platform disposed directly above the piece being worked upon and having a carriage slidable thereon so that a model may be mounted thereon for straight line movement.

25 Another object of the invention is to provide means to move the carriage on which the model is supported in one of the directions of movement of the cutter but through double the distances moved through by the cutter.

30 And finally it is an object to effect movement of the carriage on which the model is mounted by connections from the column on which the cutter is mounted.

The invention in the embodiment illustrated is
35 shown as applied directly to the machine described in the above mentioned patent in which the piece being operated upon is fixed securely in position and forms an attachment thereto. The cutter engages the piece being worked upon while
40 being moved laterally, vertically and axially relative to the work by means fully described in the above mentioned patent.

With these and other objects in view our invention includes the features of construction and
45 operation set forth in the following specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, we
50 have shown our invention applied to a reproducing machine normally employed for die sinking operations, but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or
55 limiting the scope of the invention, the claims

appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a side elevation of the complete machine described in the patent to Shaw above
60 mentioned, the attachment being shown applied in operative relation thereto.

Fig. 2 is a front elevation of the model and work piece supporting devices for association
65 with the machine shown in Fig. 1.

Fig. 3 is a front view of the machine shown in Fig. 1, indicating successive relative positions of the tracer and model during the progress of operation upon the work piece; and

Fig. 4 is a side elevation of the work piece and
70 model support mounted for movement upon a special base into and out of operative position.

In the above mentioned drawings we have shown but one embodiment of the invention which is now deemed preferable, but it is to be
75 understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly and in its preferred aspect our inven-
80 tion includes the following principal parts: First, an elevated and preferably horizontal platform disposed in position directly adjacent and above the support on which the work piece being operated on is mounted; second, a supporting car-
85 riage movable along the elevated platform and having means whereby a model may be attached thereto in proper relative position to the work piece; third, a rack fixed to the member forming the elevated platform; fourth, a rack parallel to the fixed rack and attached to the model sup-
90 porting carriage; fifth, a pinion disposed between the two racks; sixth, a saddle member slidable along the front surface of the elevated platform and rotatably supporting the pinion; and sev-
95 enth, connecting means between this carriage and the machine column carrying the cutting tool and tracer so that lateral movements of the column will be imparted to the pinion and thus effect movements of the supporting carriage and
100 model equal to double the movement of the column.

In the operation of duplicating machines such as die sinking machines, etc., it is frequently
105 desirable to make left and right counterparts of an object such as a fender, shoe last, or other irregularly shaped article, the same model being used for reproducing both the left and right forms. Heretofore in the use of the machine described in the patent to Shaw above-men-
110

tioned models were required for each form to be reproduced and the model could only be utilized to reproduce its own true form rather than a corresponding right or left counterpart. The present invention therefore relates to an attachment for a standard form of duplicating machine shown and described in the Shaw patent enabling a model to be used either to reproduce its exact form or to reproduce a similar form of the opposite hand.

Referring more in detail to the figures of the drawings we show the principal parts of the tracer controlled die sinking machine described in Shaw Patent No. 1,683,581 to which reference may be made for further and more detailed description. It will be understood from the drawings that the work piece W being operated on shown in Fig. 1 is rigidly fixed to the base 10 and bracket member 11. The cutter 12 and tracer 13 are mounted upon a head 14 in fixed relation to each other. The head 14 with its cutter 12 and tracer 13 are movable vertically upon a column 15. Preferably and as employed in the Shaw patent the head 14 carrying the tracer 13 and cutter 12 is mounted for slidable movement directly toward and from the model M and work W upon suitable horizontal ways on a carriage 16. This carriage 16 engages suitable vertical ways upon the column so that the head 14 will be movable therewith. The column 15 is slidably mounted upon ways on a portion of the base 10 and may be movable horizontally to any desired positions. The cutter 12 and tracer 13 are therefore movable to any points in-space within the capacity of the parts on which they are mounted.

In the operation of this machine the cutter 12 and tracer 13 are constantly vertically reciprocated by movement up and down of the carriage 16 and head 14, these movements being limited by suitable reversing mechanism not thought necessary to be described in connection with this application. After each vertical reciprocation of the head 14 the column 15 is stepped over horizontally on the base a short distance by any suitable feeding mechanism, this movement being continued until all parts of the work piece W have been properly passed over by the cutter 12. During this movement of the carriage 16 and column 15 the cutter 12 is movable axially toward and from the work piece with the head 14 under control of the tracer 13 through electro-magnetic operating devices. As this operation is well-known and is described in the above-mentioned patent to Shaw and forms no part of the present invention it is not thought that any further description will be required.

In the normal operation of the machine described in the Shaw patent the model M being reproduced is mounted directly above the work piece W being operated on, both work piece W and model M being fixed in position by any suitable securing means.

In order to enable the mechanism shown in the Shaw patent to be used for reproducing a corresponding left-hand article from a right-hand model or vice versa, means are employed to mount the model M for movement parallel to the movement of the column 15. The distance moved through by the model M for any movement of the cutting tool 12 and column 15 is equal to double the movement of the column 15, the means for this purpose being presently described. There is provided a bridge or gantry structure, the up- rights 20 of which are sufficiently widely spaced to

permit mounting any work piece W between them upon the bracket 11. The bridge member 21 on these uprights 20 is provided with suitable horizontally disposed ways parallel to the ways on the base portion 10 on which the column 15 reciprocates. On these ways is slidably mounted a carriage 22, suitable roller or other bearings maintaining the carriage in contact with its ways. On this carriage 22 are suitable brackets 23 whereby a model M may be suitably mounted and secured thereon. It will be seen from the above that with the carriage 22 directly above the work support 11 but fixed in position upon its ways on the bridge member 21 the machine could be used exactly as described in the patent to Shaw and the work W reproduced would correspond exactly to the model M being used.

In order to effect simultaneous and relative movements between the column 15 carrying the cutting tool 12 and the model support 23 so that the model M will move laterally double the horizontal movements of the column 15, the following connecting means are employed. Mounted on the bridge member 21 of the model support is an elongated rack 25 extending parallel to the ways on the bridge member 21 and having the rack teeth cut in its upper surface. Mounted upon the lower surface of the model supporting carriage 22 is a corresponding rack 26, the teeth of which are disposed upon its lowermost face. This rack 26 is parallel to and directly above the rack 25 on the bridge member 21 and the two racks 25 and 26 are engaged by a pinion 27 disposed between them. This pinion 27 is rotatably mounted in a saddle member 28 mounted for slidable movement upon ways along one side of the bridge member 21. A bar 29 connected to this saddle 28 and outstanding from the column 15 is provided so that lateral movements of the column 15 will correspondingly move the saddle 28. As the rack 25 on the bridge member 21 is fixed the pinion 27 is given a rolling movement therealong by the lateral movements of the column 15 and saddle 28. The model support or carriage 22 will therefore be moved through exactly twice the distance moved through by the column 15.

Fig. 3 indicates successive positions of the model M and the positions of the tracer and the tool during operation on a work piece, these being shown for three positions of the model. In this figure the model M is shown in three positions marked 1st, 2nd and 3rd. The first position is at the left of the work piece W and the tracer 13 engages the right-hand end of the model. The cutter 12 at this time engages a corresponding part on the left-hand end of the work piece W. Movements of the column 15 toward the right as indicated by the arrow together with the tracer 13 and cutter 12 carried thereon, move the model M through exactly twice the distance moved through by the column 15 in the same direction. In the second position indicated in Fig. 3 the cutter 12 is shown operating upon an intermediate portion of the work piece W and the tracer 13 is shown engaging a corresponding intermediate portion of the model M. Eventually upon completion of the feeding movement of the cutter 12 and the column 15 laterally across the work piece W as shown in the third position, the model M has moved through double its horizontal dimension and the tracer 13 and cutter 12 have moved through the exact length of the model. At this time the cutter 12 and tracer 13 engage respectively the right-hand end of the work piece W and the left-hand end of the model M. The work piece W cut out

therefore is of the same size and configuration as the model M except oppositely disposed with respect to the model. It will be understood that during the lateral movement of the column 15 and model support 22 the carriage 16 carrying the cutter head 14 is constantly being reciprocated up and down over the surface being operated on. Also the head 14 controlled by the tracer 13 is moved axially directly toward and from the work piece W to reproduce the irregularities in the model M being reproduced.

What we claim is:

1. A reproducing machine comprising in combination, a base, a column movable thereon, a carriage on said column, a head movable on said carriage, a cutter and tracer on said head and movable therewith, means to independently move said column, carriage and head, a model support mounted adjacent said column and head and movable parallelly with said column, and means connecting said model support and column whereby said support is moved in the same direction and double the distance as said column during the operation of the machine.

2. A reproducing machine comprising in combination, a base, a column movable thereon, a carriage on said column, a head movable on said carriage, a cutter spindle and tracer on said head and movable therewith, means to independently move said column, carriage and head in directions normal to each other, a model support mounted adjacent said column and head and movable parallelly with one of said members, and means connected to said model support whereby said model support may be moved in the same direction and double the distance as said member during the operation of the machine.

3. A reproducing machine comprising in combination, a base, a column movable thereon, a head movable on said column and movable in a direction normal to movement of said column, a cutter spindle and tracer on said head and movable therewith, means to independently move said column and head, a model support mounted adjacent said column and head and movable parallelly with one direction of movement of said cutter and tracer, and means connecting said column and said model support whereby said support may be moved in one of the directions and double the distance as said cutter and tracer during the operation of the machine.

4. A model support for reproducing machines comprising in combination, an elevated platform having ways thereon, a carriage movable along said ways, a rack fixed to said platform, a rack fixed to said carriage and disposed parallelly to the rack on said platform and in opposed relation thereto, a pinion disposed between said racks, and means to move said pinion to effect a rolling movement thereof upon said rack fixed to said platform and thereby move said carriage along said platform.

5. A model support for reproducing machines having a tracer controlled cutter comprising in combination, an elevated platform having ways thereon, a carriage movable along said ways, a rack fixed to said platform, a rack fixed to said carriage and disposed parallelly to the rack on said platform, a pinion disposed between said racks, and means to move said pinion adapted for connection to said machine to effect a rolling movement of said pinion upon said rack fixed to said platform and thereby move said carriage along said platform.

6. A model support for reproducing machines having a tracer controlled cutter movable over the work comprising in combination, an elevated platform having ways thereon, a carriage movable in a straight line along said ways, a rack fixed to said platform, a rack fixed to said carriage and disposed parallelly to the rack on said platform, a pinion disposed between said racks, and means to move said pinion along the first rack to effect a rolling movement thereof and thereby move said carriage along said platform, said means being operated by movement of said cutter in one direction of its movements.

JOHN C. SHAW.
ROBERT D. SHAW.

50

125

55

130

60

135

65

140

70

145

150